

What is claimed is:

1. A method for sterilizing packaging materials by using high voltage pulse power source, comprising a power source for
5 generating high voltage, a discharge side electrode to which the high voltage generated by said power source is applied, and a ground side electrode arranged so as to be opposed to the discharge side of the discharge side electrode, wherein a packaging material to be sterilized is placed between both
10 electrodes under normal temperature and normal pressure, and is sterilized by applying high voltage pulses in a gas atmosphere, characterized in that said discharge side electrode is provided with unevenness having continuous projections on the discharge side surface of said discharge
15 side electrode.

2. The sterilization method claimed as claim 1, characterized in that the unevenness on said discharge side surface is formed into a helical form.

20

3. The sterilization method as claimed 1 or claim 2, characterized in that said packaging material is a container or a film.

25 4. The sterilization method as claimed in any of claims 1 to claim 3, characterized in that said packaging material is a container and the discharge side electrode is inserted in the container.

30 5. The sterilization method as claimed in any of claims 1 to 4, characterized in that said gas is at least one kind of gas selected from a group of oxygen, nitrogen, hydrogen, carbon dioxide, air, argon and helium.

6. The sterilization method as claimed in any of claims 1 to 5, characterized in that at least one kind of gas selected from a group of oxygen, nitrogen, hydrogen, carbon dioxide, air, argon and helium is introduced during discharge.

5

7. A method for sterilizing a packaging material by using a high voltage pulse power source, comprising a power source for generating high voltage, a discharge side electrode to which the high voltage generated by said power source is applied, and a ground side electrode arranged so as to be opposed to the discharge side of the discharge side electrode, in which the packaging material to be sterilized is placed between both electrodes under normal temperature and normal pressure, and is sterilized by applying high voltage pulses in a gas atmosphere, characterized in that water or an aqueous solution is given to said packaging material before discharge, during discharge, or before and during discharge.

8. The sterilization method as claimed in claim 7, characterized in that said water or aqueous solution is given to said packaging material so as to cloud the surface of said packaging material.

9. The sterilization method as claimed in claim 7 or claim 8, characterized in that said gas is at least one kind of gas selected from a group of oxygen, nitrogen, hydrogen, carbon dioxide, air, argon, and helium, and the gas is humidified with said water or aqueous solution and introduced before discharge, during discharge, or before and during discharge.

10. The sterilization method as claimed in any of claims 7 to 9, characterized in that said discharge side electrode is provided with unevenness having continuous projections on the

discharge side surface of said discharge side electrode.

11. The sterilization method as claimed in any of claims 7 to 10, characterized in that said unevenness on the discharge side surface is formed into a helical form.

12. The sterilization method as claimed in any of claims 7 to 11, characterized in that said packaging material is a container or a film.

13. The sterilization method as claimed in any of claims 7 to 12, characterized in that said packaging material is a container, and the discharge side electrode is inserted in the container.

14. A sterilizer of packaging materials using a high voltage pulse power source, which is provided with a power source for generating high voltage, a discharge side electrode to which the high voltage generated by said power source is applied, and a ground side electrode arranged so as to be opposed to the discharge side of the discharge side electrode, and which sterilizes the packaging material to be sterilized by placing it between both electrodes under normal temperature and normal pressure and applying the high voltage pulses thereto in the gas atmosphere, characterized in that said discharge side electrode is provided with unevenness having continuous projections on the discharge side surface of said discharge side electrode.

15. The sterilizer as claimed in claim 14, characterized in that said unevenness on the discharge side surface is arranged in a helical form.

16. The sterilizer as claimed in claim 14 or claim 15,

characterized in that said packaging material to be placed between both electrodes is a container or a film.

17. The sterilizer as claimed in any of claims 14 to 16, characterized in that said packaging container is a container, and the sterilizer is provided with a discharge side electrode to be inserted in the container and a ground side electrode arranged along the outer periphery of the container.

18. The sterilizer as claimed in any of claims 14 to 17, characterized in being provided with an introduction means for introducing at least one kind of gas selected from a group of oxygen, nitrogen, hydrogen, carbon dioxide, air, argon, and helium during discharge.

19. A sterilizer of packaging materials using the high voltage pulse power source, which is provided with a power source for generating high voltage, a discharge side electrode to which the high voltage generated by said power source is applied, and a ground side electrode arranged so as to be opposed to the discharge side of the discharge side electrode, and which sterilizes the packaging material to be sterilized by placing it between both electrodes under normal temperature and normal pressure and applying the high voltage pulses thereto in the gas atmosphere, characterized in being provided with a liquid supply means for giving water or an aqueous solution to said packaging material before discharge, during discharge, or before and during discharge.

20. The sterilizer as claimed in claim 19, characterized in that said liquid supply means gives water or an aqueous solution to the surface of the packaging material so as to cloud the surface of said packaging material.

21. The sterilizer as claimed in claim 19 or claim 20, characterized in that at least one kind of gas selected from a group of oxygen, nitrogen, hydrogen, carbon dioxide, air, argon and helium is humidified with said water or aqueous solution and is given to said packaging material before discharge, during discharge, or before and during discharge by said liquid supply means.

22. The sterilizer as claimed in any of claims 19 to 21, characterized in that said discharge side electrode is provided with unevenness having continuous projections on the discharge side surface thereof.

23. The sterilizer as claimed in claim 22, characterized in that said unevenness on the discharge side surface is arranged in a helical structure.

24. The sterilizer as claimed in any of claims 19 to 23, characterized in that the packaging material to be placed between said both electrodes is a container or a film.

25. The sterilizer as claimed in any of claims 19 to 24, characterized in that said packaging material is a container, and the sterilizer is provided with said discharge side electrode to be inserted in the container, and said ground side electrode to be arranged along the outer periphery of the container.